EXPERIMENT NO. 7

TITLE: Electronic Modelling & Simulation of a current sensing device

AIM:

1. To perform interfacing of ACS712 current sensor and simulate the circuit using Proteus simulation software/tool.
2. To sense the current flowing in the circuit and display the output on a LCD.

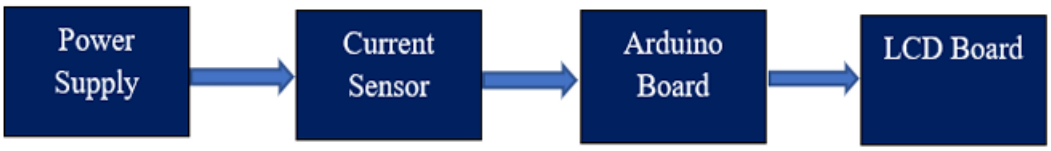
APPARATUS: Proteus software, Arduino IDE, ACS712 current sensor, LCD etc.

THEORY: ACS712 is a Hall effect based linear current sensor that can measure both direct current and alternating current and operates at 5V and produces an analog output voltage proportional to the measured current. The ACS712 is a popular current sensor IC (Integrated Circuit) manufactured by Allegro Microsystems. It's designed to measure the amount of current flowing through a conductor. The sensor operates based on the Hall effect, where a magnetic field perpendicular to the current flow induces a voltage proportional to the current.

- Key features of the ACS712 include:

1. High sensitivity: The ACS712 can measure both AC and DC currents with high sensitivity, typically around 66mV/A or 185mV/A, depending on the model (5A, 20A, or 30A).
2. Low offset and high accuracy: It provides low offset and high accuracy even when exposed to varying environmental conditions.
3. Low-noise analog signal path: The internal analog signal path is designed to minimize noise and improve accuracy.
4. Wide operating voltage range: It operates over a wide voltage range, typically between 4.5V to 5.5V.
5. Integrated Overcurrent Detection: Some models of the ACS712 come with integrated overcurrent detection, which can be used for safety and protection purposes.
6. Output options: The output is typically an analog voltage proportional to the current being sensed. This output can be interfaced with microcontrollers or analog-to-digital converters (ADCs) for further processing.

BLOCK DIAGRAM:



PROCEDURE:

- Interfacing the ACS712 current sensor with an Arduino is relatively straightforward. The ACS712 provides an analog voltage output proportional to the current being measured, and the Arduino can read this analog voltage using its built-in analog-to-digital converter (ADC).
- **Components Needed:**

1. ACS712 current sensor (choose the appropriate model based on your current measurement requirements)
2. Arduino board (e.g., Arduino Uno, Arduino Nano)
3. Breadboard and jumper wires
4. Load (the device or circuit you want to measure the current flowing through)

- **Connections:**

1. Connect the VCC pin of the ACS712 to the 5V pin of the Arduino.
2. Connect the GND pin of the ACS712 to the GND pin of the Arduino.
3. Connect the OUT pin of the ACS712 to one of the analog input pins (e.g., A0) of the Arduino.
4. Connect the LOAD (the device or circuit you want to measure the current through) to the input terminals of the ACS712.

OBSERVATION TABLE:

S.No.	Input Voltage	Output Current

SIMULATION RESULTS: